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| 10/627,385      | 07/25/2003  | Santosh S. Rao       | VRT0089US           | 3916             |

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EXAMINER

WASEL, MOHAMED A

ART UNIT PAPER NUMBER

2154

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/627,385

Applicant(s)

RAO ET AL.

Examiner

Mohamed Wasel

Art Unit

2154

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 11/3/03, 4/12/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. This action is responsive to application filed on July 25, 2003. Claims 1-31 are presented for examination.

#### *Claim Rejections - 35 USC § 101*

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claim 12 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claim is directed to instructions on a computer-readable *medium*. The term “signals” has multiple definitions and can include sound, image, or message transmitted or received in telegraphy, telephony, radio, television, or radar. Since the specification fails to define “signals” as a *tangible* medium, the claim is rendered non-statutory

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Frank et al (US Patent No. 6,532,494).

4. As per claim 1, Frank et al teach a method comprising:

a) providing a coordinator virtual device corresponding to at least a portion of a physical data storage device (*abstract, col. 1 lines 30-40, col. 3 lines 34-45*);

b) detecting when a computer system cluster, including a plurality of nodes, is partitioned (*col.9 lines 51-61, col. 2 lines 5-15*);

c) attempting to gain control of the coordinator virtual device (*abstract, Fig. 4 element 16, col.7 lines 21-37*); and

d) removing at least one of the plurality of nodes from the computer system cluster when the attempting is unsuccessful (*col.4 lines 32-34, col. 5 lines 1-5, col. 6 lines 52-62*).

5. As per claim 2, Frank et al teach the method wherein the providing a coordinator virtual device corresponding to at least a portion of a physical data storage device further comprises:

a) selecting the at least a portion of a physical data storage device (*col. 3 lines 1-20*);

b) associating a physical description of the at least a portion of a physical data storage device with a coordinator virtual device identifier (*col. 3 lines 35-45, col. 6 lines 34-40*);  
and

c) allowing at least one of the plurality of nodes of the computer cluster to access the at least a portion of a physical data storage device via the coordinator virtual device identifier (*col. 3 lines 35-45, col. 6 lines 34-40*).

6. As per claim 3, Frank et al teach the method wherein the providing a coordinator virtual device corresponding to at least a portion of a physical data storage device is performed by at least one virtual device configuration server (*col. 3 lines 1-20, col. 4 lines 32-43*).

7. As per claim 4, Frank et al teach the method wherein the at least one virtual device configuration server is separate from the plurality of nodes of the computer cluster and wherein at least one of the plurality of nodes of the computer cluster further comprises a virtual device configuration client (*col. 4 lines 7-35*).

8. As per claim 5, Frank et al teach the method further comprising:

reading cluster membership information from the coordinator virtual device corresponding to at least a portion of a physical data storage device (*col. 2 lines 61-62, Fig. 6 element 88*).

9. As per claim 6, Frank et al teach the method wherein the detecting when a computer system cluster, including a plurality of nodes, is partitioned (*col. 9 lines 51-62*) further comprising:

a) reading, as performed by one of the plurality of nodes, cluster membership information from the coordinator virtual device corresponding to at least a portion of a physical data storage device (*col. 2 lines 61-62, Fig. 6 element 88*); and

b) determining whether the cluster membership information indicates that the one of the plurality of nodes is a current member of the computer system cluster (*col. 3 lines 66-67, col. 4 lines 1-6, col. 5 lines 1-5*).

10. As per claim 7, Frank et al teach the method further comprising:

writing cluster membership information to the coordinator virtual device corresponding to at least a portion of a physical data storage device (*col. 6 lines 14-28*).

11. As per claim 8, Frank et al teach the method of wherein the coordinator virtual device corresponding to at least a portion of a physical data storage device further comprises cluster membership information (*col. 3 lines 37-57*).

12. As per claim 9, Frank et al teach the method wherein the coordinator virtual device corresponding to at least a portion of a physical data storage device is a coordinator volume (*Fig. 1 element 22, col. 3 lines 1-10*).

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13. As per claim 10, Frank et al teach the method wherein the detecting when a computer system

cluster, including a plurality of nodes, is partitioned further comprises:

a) monitoring a network coupled to each of the plurality of nodes for a heartbeat signal (*col. 4 lines 24-34, col. 6 lines 6-23*); and

b) determining when the heartbeat signal is not present for a specified period of time (*col. 2 lines 5-34, col. 5 lines 18-23*).

14. As per claim 11, Frank et al teach the method further comprising:

retaining the at least one of the plurality of nodes in the computer system cluster when the attempting is successful (*col. 8 lines 48-55*).

15. As per claim 12, Frank et al teach the method encoded in a computer readable medium as instructions executable on a processor, the computer readable medium being one of an electronic storage medium, a magnetic storage medium, an optical storage medium, and a communications medium conveying signals encoding the instructions (*col. 10 lines 62-67, col. 11 lines 1-4*).

16. As per claim 13, Frank et al teach the method further comprising:

allowing at least one of the plurality of nodes of the computer cluster to exclusively access the at least a portion of a physical data storage device (*col. 3 lines 6-44*).

17. As per claim 14, Frank et al teach the method further comprising:

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obtaining exclusive access to the at least a portion of a physical data storage device  
(*col. 3 lines 6-44*).

18. As per claim 15, Frank et al teach a system comprising:

a) a first data storage device (*abstract, col.1 lines 30-40, col. 3 lines 34-45*);

b) a virtual device configuration server coupled to the first storage device and including a first memory and a first processor configured to provide a coordinator virtual device corresponding to at least a portion of the first data storage device (*col. 10 lines 63-67; storage device, memory and processor are inherent because they are a major hardware components of a basic computer system*);

c) a plurality of virtual device configuration clients configured as a computer system cluster, at least one of the plurality of virtual device configuration clients including a second memory and a second processor (*col. 1 lines 30-40; memory and processor are inherent because they are a major hardware components of a basic computer system*) configured to:

c1) detect when the computer system cluster is partitioned (*col.9 lines 51-61, col. 2 lines 5-15*);

c2) attempt to gain control of the coordinator virtual device corresponding to at least a portion of the first data storage device (*abstract, Fig. 4 element 16, col.7 lines 21-37*);  
and

c3) remove the at least one of the plurality of virtual device configuration clients from the computer system cluster when the attempt to gain control of the coordinator virtual device is unsuccessful (*col.4 lines 32-34, col. 5 lines 1-5, col. 6 lines 52-62*).

19. As per claim 16, Frank et al teach the system wherein virtual device configuration server is further configured to:

- a) select the at least a portion of the first data storage device (*col. 3 lines 1-20*);
- b) store a coordinator virtual device identifier associated with a physical description of the at least a portion of the first data storage device (*col. 3 lines 35-45, col. 6 lines 34-40*); and
- c) allow the at least one of the plurality of virtual device configuration clients to access the at least a portion of the first data storage device via the coordinator virtual device identifier (*col. 3 lines 35-45, col. 6 lines 34-40*).

20. As per claim 17, Frank et al teach the first data storage device is at least one of a disk drive, a JBOD, a disk array, and an integrated circuit (*col. 10 lines 64-67*).

21. As per claim 18, Frank et al teach the system wherein the first data storage device is coupled to the virtual device configuration server via a network (*col. 11 lines 5-10*).

22. As per claim 19, Frank et al teach the system wherein the virtual device configuration server is a volume server, wherein the coordinator virtual device is a coordinator volume, and the plurality of virtual device configuration clients is a plurality of volume clients (*Fig. 1 element 22, col. 3 lines 1-10*).

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23. As per claim 20, Frank et al teach the system wherein the at least one of the plurality of virtual device configuration clients is further configured to read cluster membership information from the coordinator virtual device corresponding to at least a portion of the first data storage device (*col. 2 lines 61-62, Fig. 6 element 88*).

24. As per claim 21, Frank et al teach the system of claim 20 wherein the at least one of the plurality of virtual device configuration clients is further configured to determine whether the cluster membership information indicates that the at least one of the plurality of virtual device configuration clients is a current member of the computer system cluster (*col. 3 lines 66-67, col. 4 lines 1-6, col. 5 lines 1-5*).

25. As per claim 22, Frank et al teach the system wherein the at least one of the plurality of virtual device configuration clients is further configured to write cluster membership information to the coordinator virtual device corresponding to at least a portion of the first data storage device (*col. 6 lines 14-28*).

26. As per claim 23, Frank et al teach the system wherein the coordinator virtual device corresponding to at least a portion of the first data storage device further comprises cluster membership information (*col. 3 lines 37-57*).

27. As per claim 24, Frank et al teach the system wherein the at least one of the plurality of virtual device configuration clients is further configured to retain the at least one of the plurality

of virtual device configuration clients in the computer system cluster when the attempt to gain control of the coordinator virtual device is successful (*col. 8 lines 48-55*).

28. As per claim 25, Frank et al teach the system wherein the first memory and the virtual device configuration server belong to at least one of a host computer system, a cluster node, a storage appliance, a network appliance, and a storage area network (SAN) switch (*Fig. 4 element 16, col. 1 lines 30-40, col. 3 lines 34-45, col. 11 lines 5-10*).

29. As per claim 26, Frank et al teach the system wherein the at least one of the plurality of virtual device configuration clients is further configured to obtain exclusive access to the coordinator virtual device (*col. 3 lines 6-44*).

30. As per claim 27, Frank et al teach the system wherein the virtual device configuration server is further configured to allow exclusive access to the coordinator virtual device by the at least one of the plurality of virtual device configuration clients (*col. 3 lines 6-44*).

31. As per claim 28, Frank et al teach an apparatus comprising:

a) a means for providing a coordinator virtual device corresponding to at least a portion of a physical data storage device (*abstract, col.1 lines 30-40, col. 3 lines 34-45*);

b) a means detecting when a computer system cluster, including a plurality of nodes, is partitioned (*col.9 lines 51-61, col. 2 lines 5-15*);

c) a means for attempting to gain control of the coordinator virtual device (*abstract, Fig. 4 element 16, col. 7 lines 21-37*); and

d) a means for removing at least one of the plurality of nodes from the computer system cluster when the attempting is unsuccessful (*col. 4 lines 32-34, col. 5 lines 1-5, col. 6 lines 52-62*).

32. As per claim 29, Frank et al teach the apparatus further comprising:

a means for reading cluster membership information from the coordinator virtual device corresponding to at least a portion of a physical data storage device (*col. 2 lines 61-62, Fig. 6 element 88*).

33. As per claim 30, Frank et al teach the apparatus of claim 28 further comprising:

a means for writing cluster membership information to the coordinator virtual device corresponding to at least a portion of a physical data storage device (*col. 6 lines 14-28*).

34. As per claim 31, Frank et al teach the apparatus of claim 28 further comprising:

a means for determining whether cluster membership information stored in the coordinator virtual device corresponding to at least a portion of a physical data storage device indicates that the one of the plurality of nodes is a current member of the computer system cluster (*col. 3 lines 66-67, col. 4 lines 1-6, col. 5 lines 1-5*).

*Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Frank et al (US Patent No. 6,532,494)
- b. Moiin et al (US Patent No. 5,999,712)
- c. Modiri et al (US Patent No. 6,192,401)
- d. Reuter et al (US Patent No. 6,226,717)
- e. Frank et al (US Patent No. 6, 871,222)
- f. Slaughter et al (US Patent Application Pub. No. 2001/0032324)
- g. Yamagami, Kenji (US Patent Application Pub. No. 2002/0095489)
- h. Cruciani et al (US Patent Application Pub. No. 2004/0210673)
- i. Shirriff, Kenneth W (EP Application No. 1274012 A2)
- j. Moiin et al (EP Application No. 810526 A1)


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohamed Wasel whose telephone number is (571) 272-2669. The examiner can normally be reached on Mon-Fri (8:00 am - 4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Follansbee can be reached on (571) 272-3964. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MW

August 31, 2005

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